

THREE NEW SPECIES OF CHILEAN CADDISFLIES (INSECTA: TRICHOPTERA)

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Abstract.—Three new species of caddisflies are described from Chile, *Mastigoptila complicornuta*, n. sp., *Mastigoptila elae*, n. sp. (Glossosomatidae), and *Smicridea* (*Smicridea*) *figueroai*, n. sp. (Hydropsychidae). The *Mastigoptila* species are characterized by asymmetrical male genitalia bearing long processes from the inferior appendages and phallocrypt and by complex phallic structures. The species of *Smicridea* is characterized by a pair of dorsomedial spines in the phallus.

Key Words: new species, Chile, Neotropics, caddisflies, biodiversity, taxonomy, Glossosomatidae, Hydropsychidae

Among all the South American countries, the Trichoptera fauna of Chile is perhaps the most well known. This is due mainly to the work of two researchers, the late F. Schmid, Canadian National Collection, and O. S. Flint, Jr., of the Smithsonian Institution. Schmid, in a series of papers beginning in 1955 (e.g., Schmid 1958), described many new species and genera, almost entirely from material supplied to him by the Chilean naturalist and collector Luis E. Peña. Schmid's other significant contribution to our knowledge of the fauna was his monograph on Hydrobiosidae (Schmid 1989). Later, from about the mid-1960s to the present, Flint described much additional material, some supplied to him by Peña and other collectors, but most collected by himself during several visits to the country (e.g., Flint 1967, 1974a, 1989, 1999, 2002). A few other workers, most notably L. Navás, described additional species. Together, Schmid, Flint, and Navás described 86% of the known Chilean caddisfly fauna (91, 72, and 18 species, respectively) (see Flint et al. 1999 for additional references to the Chilean fauna).

Undoubtedly, Schmid and Flint's interest in the fauna was influenced by its high degree of endemism; it is unlike anything in the rest of the Neotropical Region (Flint 1974b). At the species and generic level, Chile's caddisfly fauna is almost 100% endemic, but many of its families are shared with those of Australia and New Zealand. The fauna is clearly part of the well-documented trans-Antarctic biota (Crisci et al. 1991). While the fauna is highly endemic, only about 210 species are known from the country (Flint 1974a, Flint et al. 1999); this is not very diverse by South American standards. Even so, new species are still being discovered and described as Flint's recent papers, as well as the present one, attest.

In January of 2000, I had the pleasure of travelling to Chile with Dr. Fernando Muñoz, University of Minnesota, at the invitation of Ms. Elizabeth Araya and Mr. Ricardo Figueroa, both then researchers in the aquatic biology section of "EULA-Chile" (Europe-Latin America, a research partnership between Chile and the European Union) at the Universidad de Concepción.

We collected at several localities in the foothills of the Andes from Concepción south to Osorno, with most of the collections coming from the Río Bío Bío basin, the focus of study of the EULA researchers. The resulting material contained three new species, one each in the genera *Mastigoptila* (Glossosomatidae), *Smicridea* (Hydropsychidae), and *Microthremma* (Helicophidae). The specimens of *Microthremma* were subsequently sent to Dr. Flint for inclusion in his recent revision of the genus (Flint 2002) and were described as *M. patagonica*. In return, Dr. Flint kindly sent me specimens he collected in 1969 of a second undescribed species of *Mastigoptila* to include in this paper.

Types of the species described herein are deposited in the University of Minnesota Insect Collection, St. Paul, Minnesota (UMSP), the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (NMNH), and the Universidad de Concepción, Concepción, Chile (UDEC) as indicated below. Morphological terminology follows that of Flint (1989) for *Smicridea*, but a different interpretation from that presented by Flint (1967, 1974d) for the male genitalia of *Mastigoptila* is provided.

Mastigoptila Flint

Mastigoptila Flint 1967: 49 [type species: *Mastigoptila curvicornuta* Flint 1967, original designation].—Schmid 1958: 191 [diagnosis of Chilean species, as *Antoptila* Mosely]; Flint et al. 1999: 25 [systematic catalog].

The description of the two new species below brings to ten the number of species now known in the genus (Flint et al. 1999), making it the largest of the three glossosomatid genera occurring in Chile, all in the subfamily Protoptilinae and all endemic to the subregion. The other two Chilean genera, *Scotiotrichia* Schmid and *Tolluaca* Schmid, are each monobasic. Valverde and Miserendino (1998) described the larval stages and biology of *Mastigoptila longi-*

cornuta from Argentina. Flint (1963) and Angrisano (1995) provided keys to the adults of the South American genera.

Mastigoptila complicornuta Holzenthal, new species (Fig. 1)

Like other species in the genus, this new species has highly complex, asymmetrical male genitalia. While these fit the general ground plan of the genus, they are unlike the male genitalia of any of the described species, except perhaps *M. ecornuta* which shares with the new species a hoodlike tergum X with an absence of processes.

Male.—Length of forewing 5 mm. Body and appendages fuscous; forewings fuscous, with small patch of cream colored setae at arculus and very faint transverse line of lighter setae over cord. Genitalia as in Fig 1. Sternum VI with prominent posteromesal process. Sternum VII with small, posteromesal point. Sternum VIII lacking process. Segment IX broadest laterally, anterior margin broadly rounded, posterior margin angular, lightly sclerotized dorsolaterally, excavated ventrolaterally, sternum produced posteriorly; in dorsal view, tergum IX with broad U-shaped excavation anteriorly, tergum forming very narrow, slightly produced sclerotized bridge; in ventral view, sternum IX with roughly V-shaped excavation anteriorly, produced posteriorly, sternum forming a heavily sclerotized narrow bridge. Tergum X hoodlike, extending over phallic apparatus, setose apically, laterally, and ventrally, lightly sclerotized dorsally, posterior margin somewhat irregular, ventral margin shelflike, produced mesally, heavily sclerotized mesobasolaterally and forming apparent articulation with segment IX; in dorsal view, tergum X irregular laterally, with broad, U-shaped excavation apically; internally with pair of hemispherical excavations and pair of terete, anteriorly directed apodemes. Inferior appendages complex, asymmetrical, fused and produced medially into broad, quadrate, truncate, apically setose process;

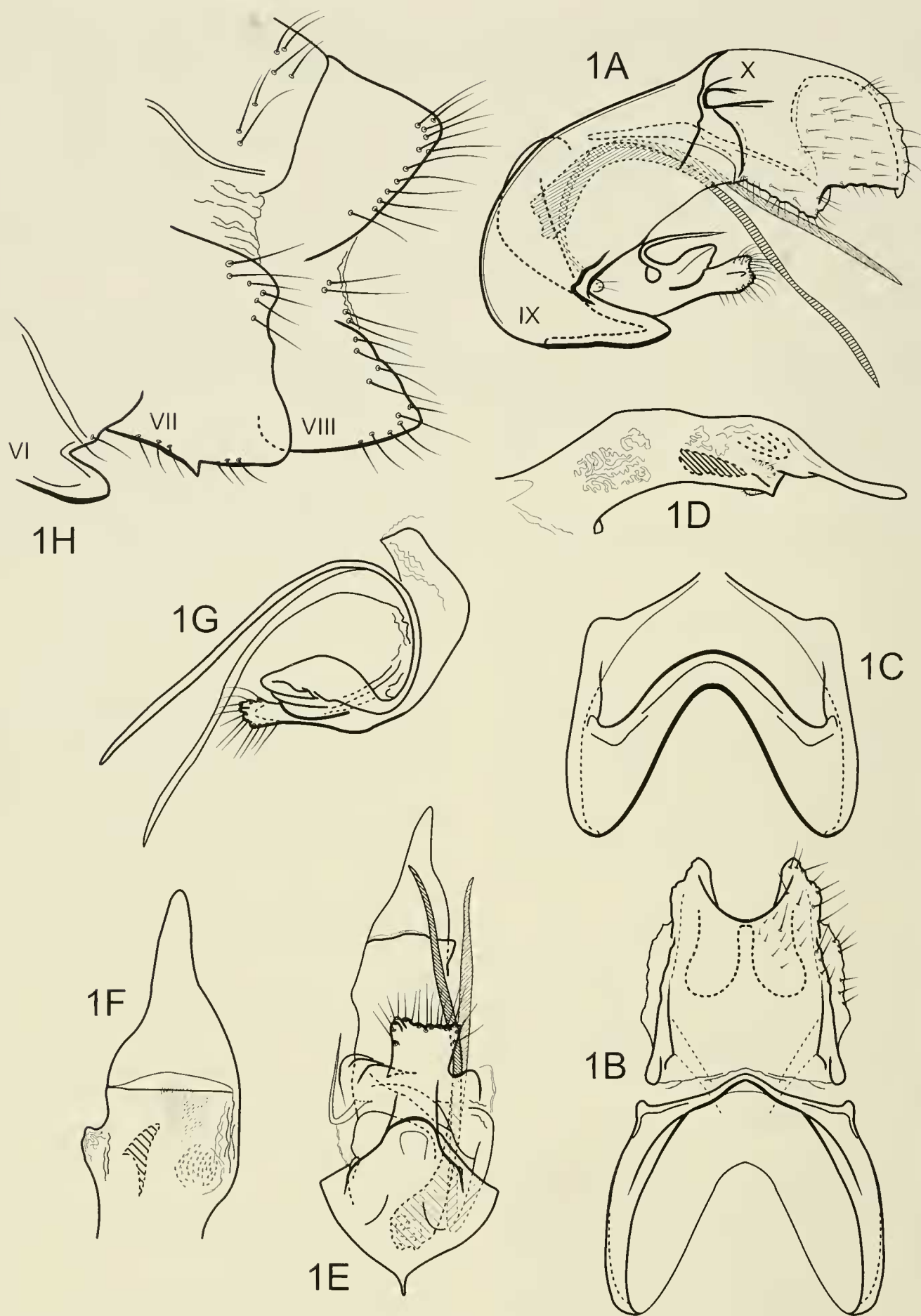


Fig. 1. *Mastigoptila complicornuta*, male genitalia. A, Segments IX and X, left lateral. B, Same, dorsal. C, Segment IX, ventral. D, Phallic apparatus, lateral. E, Phallocrypt, inferior appendages, and phallus, ventral. F, Apex of phallic apparatus, enlarged, ventral. G, Inferior appendages and phallocrypt, right lateral. H, Segments VI-VIII, lateral.

the inferior appendage complex fused basally with base of lightly sclerotized phallocrypt; left inferior appendage small, ear-shaped, bearing small, slender, recurved, posteriorly directed, spinelike basodorsal process; right inferior appendage larger, ear-shaped, with heavily sclerotized ridges ventrally, bearing long, slender, highly recurved, ventrally directed, spinelike, basodorsal process; with pair of very small setose processes at basolateral corners of fused inferior appendages. Phallocrypt a lightly sclerotized cup, fused basally with base of inferior appendage complex, acting as receptacle for base of phallic apparatus; bearing long, slender, highly recurved, ventrally directed, spinelike process originating from membranes of phallocrypt above base of phallic apparatus. Phallic apparatus asymmetrical, complex, tubular, with highly convoluted internal membranes basally; truncate subapically, apex flat, extended posteriorly as acutely triangular shelf; right side of phallic apparatus slightly inflated laterally, left side with small membranous setose protuberance; ventally with setose membranous mound on right side, large internal toothlike spine on left side, medially with patch of fine microtrichia.

Female.—Unknown.

Type material.—Holotype, ♂. CHILE: *VIII Región del Bío-Bío*: Bío-Bío: small trib. to Río Queco, 5 km E Ralco, 37°51.619'S, 71°36.257'W, el. 500 m, 16.i.2000, Holzenthal and Muñoz (UMSP). Paratypes. Same data as holotype, 4 ♂ (UMSP), 2 ♂ (NMNH), 2 ♂ (UDEC). *VII Región del Maule*: Linares: Emb[alse] Bulileo, 36°18'S, 71°25'W, 11–12.i.1994, C. and O. Flint, Jr., 2 ♂ (NMNH).

Etymology.—The name is derived from the Latin word for complex and refers to the complex, intricate structure of the male genitalia. The suffix “cornuta” is in keeping with that of other names in the genus, referring to the hornlike process of tergum X in those species (absent in *M. complicornuta*).

Mastigoptila elae Holzenthal,
new species
(Fig. 2)

This species is most similar to *M. ventricornuta* Flint. Both species share the possession of a prominent process on the ventral margin of tergum X and a similarly shaped inferior appendage complex. However, in the new species the process on tergum X is much larger and the medial process of the inferior appendage is more quadrate than in *M. ventricornuta*. The two species differ significantly in the structure of the phallic apparatus, which in *M. elae* has an unusual receptacle for the tip of the recurved spinelike process of the inferior appendage.

Male.—Length of forewing 3 mm. Body and appendages fuscous; forewings light fuscous, with small patch of cream colored setae at arculus and very faint tranverse line of lighter setae over cord. Genitalia as in Fig. 2. Sternum VI with prominent posteromesal process. Sternum VII with small, posteromesal point. Sternum VIII lacking process. Segment IX broadest laterally, anterior margin slightly rounded, posterior margin angular, lightly sclerotized dorsolaterally, excavated ventrolaterally, sternum narrowly produced posteriorly; in dorsal view, tergum IX with broad U-shaped excavation anteriorly, tergum forming very narrow, slightly produced sclerotized bridge; in ventral view, sternum IX with roughly V-shaped excavation anteriorly, produced posteriorly, sternum forming a heavily sclerotized narrow bridge. Tergum X large, quadrate, hoodlike, extending over phallic apparatus, setose apically, laterally, and ventrally, lightly sclerotized dorsally, posterior margin truncate, produced basomesally into prominent process, not heavily sclerotized mesobasolaterally, without apparent articulation with segment IX; in dorsal view, tergum X irregular dorsolaterally, truncate apically; internally with pair of narrow, sinuous excavations and pair of terete, anteriorly directed apodemes. Inferior

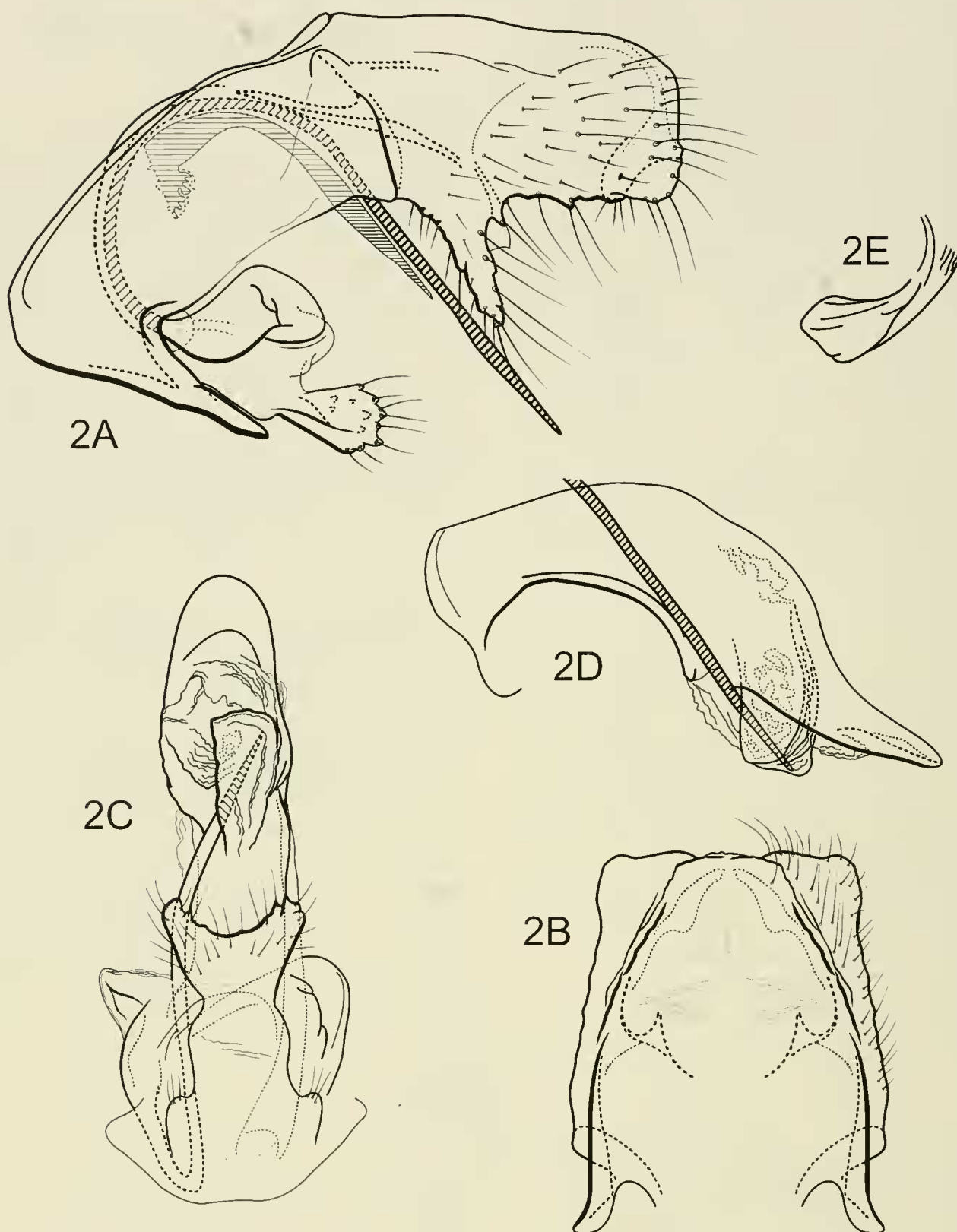


Fig. 2. *Mastigoptila elae*, male genitalia. A. Segment IX and X, left lateral. B. Segment X, dorsal. C. Phallocrypt, inferior appendages, and phallus, ventral. D. Phallic apparatus, lateral (showing insertion of apex of recurved basodorsal process of left inferior appendage). E. Right inferior appendage, lateral.

appendages complex, asymmetrical, fused and produced medially into broad, rounded, setose process, in ventral view this process roughly triangular, apicolateral corners tereate, excavated mesally; the inferior appendage complex large, body heavily scler-

otized with sclerotized ridges and folds, fused basally with base of lightly sclerotized phallocrypt; left inferior appendage large, broadly S-shaped, bearing very long, slender, recurved, posteriorly directed, spinelike basodorsal process; right inferior

appendage much smaller, roughly quadrate, with only very weakly developed basodorsal process; with pair of larger setose processes at basolateral corners of fused inferior appendages. Phallocrypt a very lightly sclerotized hemispherical cup, fused basally with base of inferior appendage complex, acting as receptacle for base of phallic apparatus; bearing shorter, thicker, curved, ventrally directed, spinelike process originating from membranes of phallocrypt above base of phallic apparatus. Phallic apparatus asymmetrical, complex, tubular, roughly S-shaped, with highly convoluted internal and external membranes subapically; apex flat, spatulate, extended posteriorly; right side of phallic apparatus with unique, semisclerotized, rugose, cuplike receptacle for apex of recurved basodorsal process of left inferior appendage, phallic apparatus without apparent internal spines, setae, or microtrichia.

Female.—Unknown.

Type material.—Holotype, ♂. CHILE: *VII Región del Araucanía*: Cautín: nr. Pucon, 4.i.1966, Flint and Cekalovic (NMNH).

Etymology.—I am very happy to name this species in honor of Ms. Elizabeth Araya in recognition of her hospitality and assistance during my visit to Chile and for her continued friendship. The name is derived from Elizabeth's nickname, "Ely."

Smicridea McLachlan

Smicridea McLachlan 1871: 134 [type species: *Smicridea fasciatella* McLachlan 1871, subsequent selection of Milne 1936].—Flint 1974c: 1 [revision of North and Central American species]; Flint 1989: 1 [revision of Chilean species]; Flint et al. 1999: 71 [systematic catalog].

This new species brings to 16 the number of *Smicridea* known from Chile. All belong to the subgenus *Smicridea* except one, *S. murina* McLachlan, in the subgenus *Rhyacophylax*. Of the 16 species, 11 were described by Flint in his 1989 paper where he also described the immature stages and pro-

vided a key to the males and females. The genus is the largest among the Neotropical Hydropsychidae with more than 160 described species (Flint et al. 1999).

Smicridea (Smicridea) figueroai

Holzenthall, new species

(Fig. 3)

This new species seems to fall squarely within the *smilodon* group of Flint (1989), containing until now only the species *S. redunda* Flint and *S. smilodon* Flint; the new species is most similar to the latter. With those species, it shares the thin lobe on the ventral margin of tergum X and a short, compact phallus with the basal opening at a right angle to the stem and an enlarged apex bearing a pair of sclerotized spines. However, the details of the morphology of the phallic apex in *S. figueroai* are quite different, especially in its possession of dorsomedial spines rather than apical, ventrally directed spines in the other species.

Male.—Length of forewing 6.5–7.0 mm. Color generally pale stramineous, appendages paler, antennae annulate; dorsum of head and thorax with white setae; forewing whitish-yellow, apical two-thirds of wing faintly irrorate with light brown patches of setae, darker, larger patch at pterostigma, and series of more distinct patches of brown setae along basal half of costal margin. Eye of male in anterior aspect with diameter about two-thirds that of interocular distance. Anterolateral process of sternum V shorter than sternum; abdominal segments VI and VII each with pair of internal, elliptical, reticulate sacs, each slightly shorter than the segment in which it lies. Genitalia as in Fig. 3. Segment IX with anterior margin vertical. Tergum X deeply divided dorsomesally, tergite terete posteriorly in dorsal view, slightly upturned in lateral view; ventral margin with large thin lobe basad. Inferior appendage with basal segment slender, slightly inflated apicad; apical segment short, blunt. Phallus with basal opening at right angle to stem, subapically enlarged,

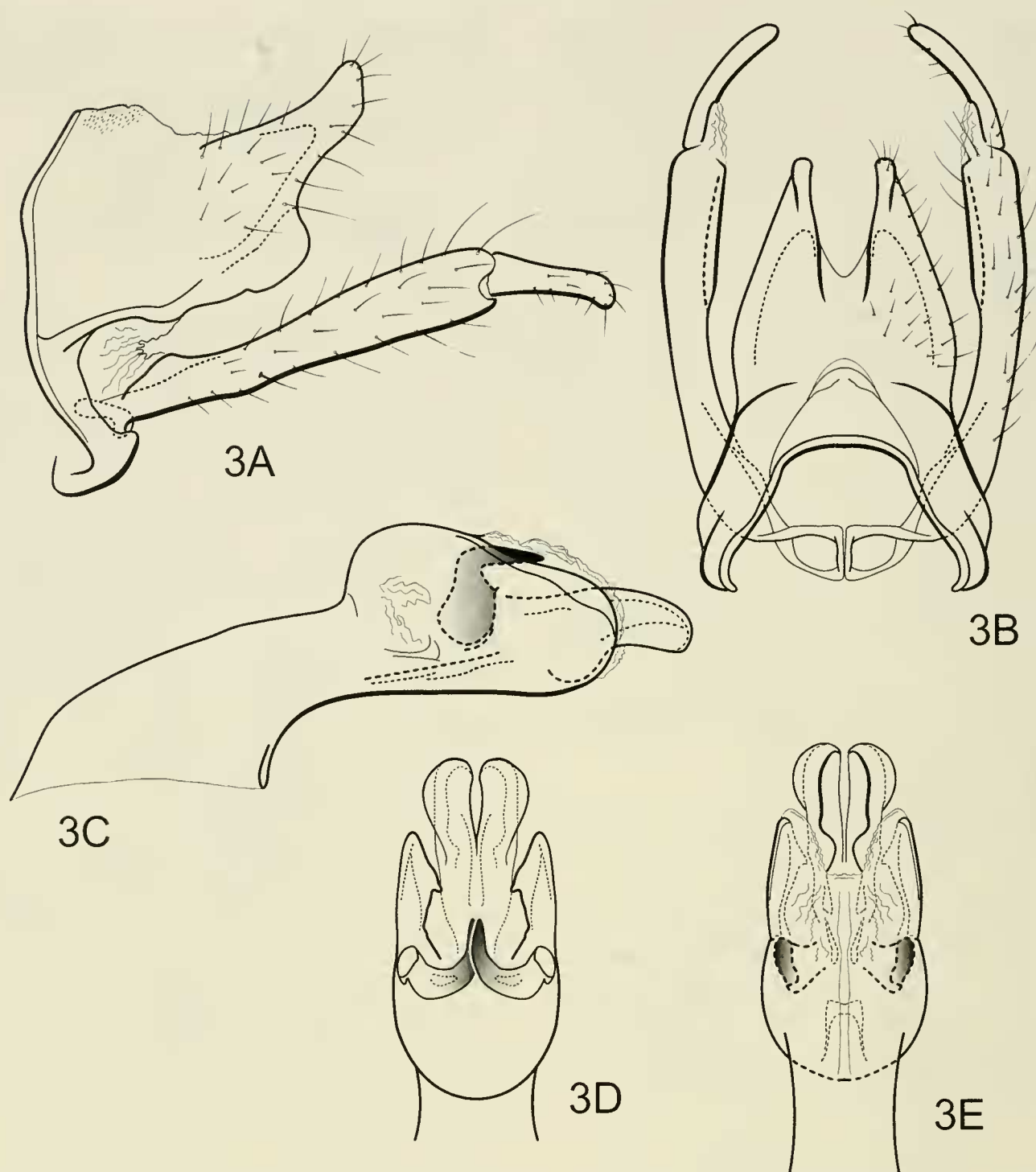


Fig. 3. *Smicridea figueroai*, male genitalia. A. Segments IX and X, lateral. B. Same, dorsal. C. Phallus, lateral. D. Apex of phallus, dorsal. E. Same, ventral.

bulbous, especially dorsomedially, the enlarged area consisting of paired, broad, rounded lateral plates, flanking a membranous mesal region from which arises dorsomesolaterally a pair of hook-shaped, heavily sclerotized, posteriorly directed spines; phallus terminating in paired, lateral sclerites, cup- or scooplike mesally, longer than wide and projecting anteriorly well beyond bulbous subapical portion.

Female.—Unknown.

Type material.—Holotype, ♂. CHILE: *VIII Región del Bío-Bío*: Bío-Bío: small trib. to Río Queco, 5 km E Ralco, 37°51.619'S, 71°36.257'W, el. 500 m, 16.i.2000, Holzenthal and Muñoz (UMSP). Paratypes. Same data as holotype, 2 ♂ (UMSP), 1 ♂ (NMNH), 1 ♂ (UDECI).

Etymology.—I take great pleasure in naming this species in honor of my friend, Ricardo Figueroa, in recognition of his generous assistance during my visit to Chile in

2000 and his continued friendship and collaboration.

ACKNOWLEDGMENTS

I am grateful for the support provided to me by EULA-Chile, Universidad de Concepción, especially its director, Dr. Oscar Parra, during my research and collecting efforts in Chile. I am especially indebted to Elizabeth Araya and Ricardo Figueroa for their friendship and collaboration. Dra. Vivien Jerez graciously provided access to the insect collection in the Museo de Zoología, UDEC. Fernando Muñoz offered invaluable assistance in helping to arrange my visit to Chile and provided much help and comradeship in the field. Dr. Oliver Flint generously provided material, including one of the new species, for examination and inclusion in this study. Financial support to travel to Chile was provided by the Office of International Programs, University of Minnesota. This material is based upon work supported by the National Science Foundation grant DEB 0117772.

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